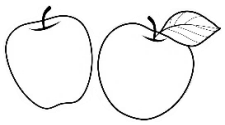
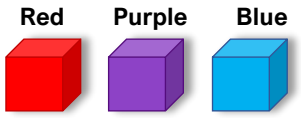
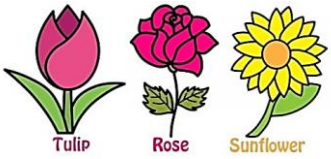
First Name: _____	**Last Name:** _____	**Grade:** _____
Teacher: _____	**Parent's email:** _____	

Finding Possibilities

Welcome to Math Challenge #9. In this challenge, most problems can be solved by making an organized list. This strategy is particularly useful when you need to find all the possible solutions to a problem that has more than one answer to it. By making an organized list, we make sure to count all the possibilities and avoid double counting.
This set of problems is quite challenging. Get your families (grandparents, parents, siblings, cousins, and neighbors) to help you solve these math problems.
For a complete overview of elementary problem-solving strategies, visit at https://www.mathinaction.org/problem-solving-strategies.html.

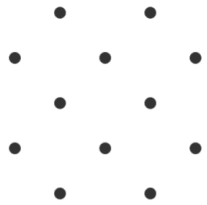
Kinder & First Grade: solve <u>at least</u> 3 problems.
Second & Third Grade: solve <u>at least</u> 7 problems.
Fourth Grade and above: solve <u>at least</u> 12 problems.

		Answer
1.	Matthew has a blue crayon and a red crayon. He starts coloring a coloring page that has 2 apples. If Matthew colors each apple with either blue or red, how many different ways can the coloring page look like? 	
2.	Anisha was given 3 colored blocks to play. She loves to build a tower by stacking these blocks and then knocking them down. In how many ways can Anisha build a tower using a red, purple, and blue block? 	
3.	Melody dresses up her teddy bear. Her teddy bear's coat has 3 buttons. She sometimes buttons them up starting with the top button, but sometimes starts somewhere else. How many possible ways can Melody button-up the coat for her teddy bear? 	
4.	Mrs. Heins has 3 different flowers (a tulip, a rose, and a sunflower) and she would like to use two different vases. How many different ways can Mrs. Heins put all 3 flowers in to 2 vases so that each vase has at least one flower?  	

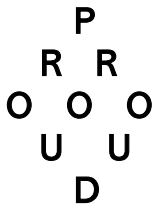
5. Wesley was given 4 cards with 4 different digits as shown below. How **many 2-digit numbers** can be formed from these cards?

6. If we take two different numbers from 1, 2, 3, 4, 5 and find their sum, how many different sums can we obtain?

7. Trisha has one each of a $1, $5, $10, $20 and $50 bill in a jar. She closes her eyes and select one of the bills out of the jar. Out of the 5 possible bills, how many different bills could she have removed so that the amount left in the jar would be less than $70?

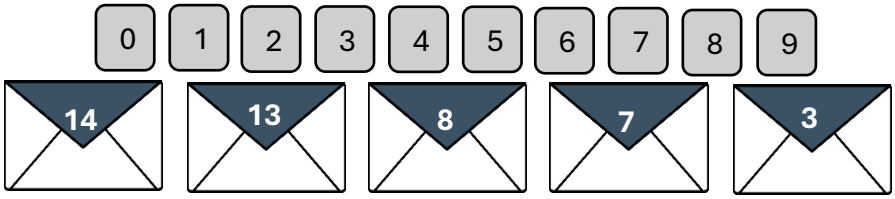
8.  How many different **sets of four dots** can be joined to form a square?

9. In the diagram on the right, each "path" from top to bottom correctly spells the word **PROUD**. What is the total number of different paths in the diagram?



10. Carla is making bracelets. She has a bucket full of red and blue beads. How many unique bracelets are there if Carla uses only 4 beads in her design, using just these beads and no clasp, so she can rotate it or flip it?

This design  is considered the same as this one  .

11.	Carla's sister, Veronika, is also making bracelets using 2 different colors of beads (red and blue). How many unique bracelets are there if Veronika uses 6 beads in her design? This design  is considered the same as this one  .	
12.	Katie and her friend Jackson went to the grocery store. Jackson bought 3 apples and 4 oranges. Katie bought apples, oranges, and pears. She bought the same total number of fruits as Jackson. How many possible combinations of fruits that Katie could have bought?	
13.	An ice cream shop offers customers the choice of a cup or a cone. It offers a choice of three different flavors: chocolate, vanilla, or strawberry. It also offers three different toppings: sprinkles, peanuts, or hot fudge. How many different combinations result from choosing a cone or a cup, one scoop of one kind of ice cream, and one topping? 	
14.	A set of ten cards, each showing one of the digits from 0 to 9, is divided up between five envelopes so that there are **two cards** in each envelope. The sum of the cards inside is written on each envelope:  How many possible combinations of two cards could be inside the envelope with number 8? What are they?	

15. When you roll two regular six-sided dice,

a. How many possible combinations of numbers can result?

a.

b. How many of those combinations, when the number on the two dice are added together, have a sum that is ten or greater?

b.

16. 

Jane likes to paint rocks. She collected 15 small rocks and separated them into 4 piles. Each pile has a different number of rocks. What is the smallest possible number of rocks that could be in the largest pile?

17. In how many distinct ways can the letters of the word **PIZZA** be arranged?

18. Many places in the world use the 24-hour time format. 24-hour time format is similar to the regular a.m./p.m. time, except that you keep counting up after you get past 12 p.m. (noon). For example, when a 24-hour digital clock shows 13:15, it is 1:15 p.m.

When a 24-hour digital clock turned from 08:32 to 08:33, the digit 3 appeared 3 times: once when it was 08:32, and the second and third appearance is when it was 08:33.
On a digital clock showing 24-hour time, over a whole day, how many times does a 5 appear?

Solution is available on February 16, 2024
www.mathinaction.org